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Value Implications of Investments in Information Technology[1]

by Rajiv D. Banker, Professor and the Merves Chair in Accounting and Information Technology

"… does IT create value that is reflected in the market value of firms and in their future profitability?"

Dr. Rajiv D. Banker
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[1]Taken from: Anderson, Mark C., Banker, Rajiv D., Ravindran, Sury. "Value Implications of Investments in Information Technology." forthcoming in *Management Science* (2006)

Introduction

Public interest in the economics of information technology has focused recently on a debate whether companies overspend on IT (Carr, 2004). Skeptics charge that companies spend excessively on IT under the "mistaken" belief that strategic use of IT can provide a sustainable competitive advantage. They caution that companies should avoid investing in new applications and let their competitors bear the costs of experimenting with IT. Proponents argue that companies can make innovative use of IT to connect with customers and suppliers in ways that create value by taking advantage of the unique resources of a firm. On one side of the debate is the argument that IT is easily replicable and cannot provide sustained competitive advantage because profits obtained from improved business performance would be competed away. On the other side is an argument that IT may be used to leverage other firm-specific resource advantages or opportunities (Clemons and Row, 1991). Proponents also argue that firms may develop sophisticated IT architecture and skills that are not easily replicable so that IT capabilities themselves may become a strategic resource (Mata, Fuerst and Barney, 1995). The debate leads to a question whether IT does create value that is reflected in the market value of firms and in their future profitability. This question has been hard to address empirically because of difficulties in obtaining data about IT investment that can be linked to firm performance.

The publicity and specter of potential disaster surrounding Y2K raised concern about Y2K solutions to top management levels of large corporations. Moreover, the Y2K frenzy occurred at a critical time in the development and deployment of enterprise systems such as SAP and other e-business applications that could alter the way companies did business. As innovative IT managers looked towards the new millennium, they saw not only concerns about their preparation for the year 2000 date turnover but also an opportunity to change the IT infrastructure to compete effectively in an increasingly information-oriented business world. Thus, Y2K was more than fixing a bug; it provided an opportunity for managers to improve their IT systems. The combination of advances in business applications of IT, significant IT investment decisions and unparalleled disclosure of IT costs across companies provides a unique opportunity to evaluate the association between firm value and IT spending.

Critics allege that the Y2K risk was inflated and that companies spent excessive amounts on IT during the late 1990s when managers overspent on enterprise systems by tying IT needs to Y2K (Hopkins and Kessler 2002, Strassman 2000). We posit that Y2K helped open the way for managers to add value to their companies by acquiring IT that enabled them to interact in new ways with customers and suppliers. We evaluate the veracity of claims that Y2K spending eroded shareholder value by looking directly at the association between Y2K spending and the market value of Fortune 1000 firms. Contrary to the allegations that firms got carried away in their Y2K spending, we find evidence of a positive association between Y2K spending during 1999 and shareholder value, and financial performance in the subsequent four years from 2000 to 2003.

continued page 2

Banker ***continued***

Our primary thesis contends that managers may have taken advantage of the Y2K situation to make opportunistic investments in IT that gave them capabilities to create value by interacting differently with their customers and suppliers. Because there would have been greater opportunities to make innovative investments in IT for firms operating in industries that are being transformed in today's information-oriented economy, we evaluate the association between firm value and Y2K spending separately for firms in automate, informate and transform industries. In automate industries, IT is used primarily to automate existing labor-intensive processes. In informate industries, IT is used to disseminate information to managers to facilitate improved decision making. In transform industries, IT is used to transform business processes and value chains. We find significantly greater positive associations between firm value measured during the years 1999 through 2003 and Y2K spending for firms in transform industries than for firms in the informate and automate industries.

This research contributes to the debate whether IT matters. Carr (2003) claimed that a competitive advantage obtained through innovative investment in IT is likely to be short-lived because competing firms would mimic successful IT applications. He advised managers to avoid the high costs of IT leadership. The question whether a competitive advantage derived from IT may be sustained has been raised frequently in the Information Systems literature (Vitale, 1986; Clemons and Row, 1991; Mata, Fuerst and Barney, 1995). An empirical implication of the argument that IT-based competitive advantage would be nullified via replication by competing firms is that the positive influence of a firm's IT spending on shareholder value would be reduced as the level of spending by competing firms increased. We test this relative investment hypothesis by including the industry median values of Y2K spending by industry type as separate variables in our empirical model relating shareholder value to firm Y2K spending. Contrary to the relative investment hypothesis, we do not find negative coefficients on industry median Y2K spending offsetting positive coefficients on firm IT spending.

Empirical research in Information Systems has relied on stock market values to represent expectations of future earnings improvements associated with IT investments (Dos Santos, Peffers and Mauer, 1993; Bharadwaj, Bharadwaj and Konsynski, 1999). But due to difficulties in isolating the influence of specific IT investments on firm performance, this empirical research has not demonstrated sustained improvements in earnings associated with investments in IT. We estimate an earnings prediction model that uses time-series information about earnings and other information available in 1999 to forecast earnings from 2000 to 2003. We find significantly positive associations between earnings in 2000 through 2003 and Y2K spending in 1999 for firms in the transform industries.

By documenting a high association between market value and Y2K spending in the transform industries, our analysis indicates that, in situations when IT facilitates changes in business practices in an industry, managers must respond aggressively by investing in IT in order to maintain or improve their firms' competitive positions. Our findings that the high association between market value and Y2K spending for firms in transform industries was sustained through the market downturn in 2000-01 and beyond indicates that this higher market valuation was not due to market infatuation with technology but to perceived sustained benefits from improvements in business operations.

Our analysis is aimed at the question whether companies can create value by making innovative investments in IT. We look at the Y2K case from the point of view that managers could have taken advantage of Y2K to make opportunistic investments in IT that positioned them for e-business in the new millennium. The Y2K bug effectively reduced the marginal cost of replacing old IT with new IT because remediation costs could be avoided if the firm acquired new IT that was Y2K compliant. Surveys and media reports linking Y2K to investments in Enterprise Resource Planning and other systems suggest that firms did make investments in innovative IT in preparation for Y2K (Buchner, 1999; Foremski, 1999; Manchester, 1999; Telberg, 2000; Xenakis, 2000). But the Y2K spending disclosures do not distinguish between corrective spending on existing IT and opportunistic investing in new IT. If higher Y2K spending was due to greater investing in innovative IT, then we expect to observe a positive relation between shareholder value and Y2K spending.

> *"… managers may have taken advantage of the Y2K situation to make opportunistic investments in IT that gave them capabilities to create value by interacting differently with their customers and suppliers."*

Five Hypotheses

Hypothesis 1: There is a positive association between shareholder value and Y2K spending.

Hypothesis 2: There is greater positive association between shareholder value and Y2K spending for firms in the informate industries than for firms in the automate industries.

Hypothesis 3: There is greater positive association between shareholder value and Y2K spending for firms in the transform industries than for firms in the informate and automate industries.

Hypothesis 4: There is a negative association between shareholder value and the industry level of spending on Y2K.

Hypothesis 5: There is a positive association between earnings in future periods and Y2K spending that is higher for firms in transform industries than for firms in automate and informate industries and higher for firms in informate industries than automate industries.

The estimated coefficients on Y2K spending for firms in automate industries are not significantly positive in any of the quarters between 1999 and 2003 and the coefficients on Y2K spending for firms in the informate industries are significantly positive only in a couple of quarters between 1999 and 2003.[2] The coefficients on Y2K spending for firms in the transform industries are, however, significantly positive in nine of the 10 quarters presented, providing strong support for Hypothesis 3 that the association between the market value of firms and Y2K spending is highest for firms in the transform industries.

Just as the coefficient on R&D spending reflects the complementarity of R&D with other firm resources, the coefficient on Y2K spending for transform industries reflects the complementarity of investments in IT with other organizational assets. This complementarity may be with pre-existing organizational assets, contemporaneous investments in organizational assets, or anticipated future investments in IT and other organizational assets. Firms that had organizational structures in place that enabled them to take better advantage of new IT would likely have invested more and realized greater increases in firm value than other firms (Clemons and Row, 1991). Firms that made contemporaneous investments in organizational assets to complement investments in IT would have increased the returns to both investments (Milgrom and Roberts, 1995). Anticipated future investment could also have affected the shareholder value of current investment in IT. For example, by investing in enterprise systems and making complementary investments that changed internal processes and external interactions, firms opened the way to make complementary investments in such applications as supply chain management (SCM) or customer relationship management (CRM) systems.

With the exception of one quarter for firms in the automate industries, the estimated coefficients on industry median Y2K spending are not significantly negative in any quarter where there is a significantly positive coefficient on firm Y2K spending across the three industry types. Hypothesis 4 on relative investments is thus not supported by the evidence.

There is a potential issue of endogeneity with respect to the market value of the firm and investment in IT. For example, firms with higher market values (relative to their book values) are more likely to anticipate greater growth and may have more aggressive investment strategies. We address this possibility with three-stage least squares estimation of a simultaneous equations model.

continued page 4

[2] The fact that the automate and informate industry coefficients on Y2K spending are not significantly different from zero in most cases may mean that investment in new IT did not have a significant impact on firm value or that Y2K spending in these industries was primarily corrective in nature.

Board Characteristics, Accounting Report Integrity, and the Cost of Debt

by David Reeb, Associate Professor, Department of Finance

Does board independence and board size influence the cost of debt financing?

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Boards of directors are responsible for monitoring, evaluating, and disciplining firm management. Perhaps one of the most important responsibilities of the board from a creditor's perspective is oversight of financial reporting. Because debt holders rely on accounting based covenants in lending agreements, creditors have concerns with board and audit committee monitoring of the financial accounting process. Board attributes that influence the validity of accounting statements may thus be of great importance to creditors. In this study, we examine the relation between board structure and the cost of debt financing. Based on the notion that independent directors are better monitors of management, we test whether the firm's cost of debt decreases in the proportion of independent directors on the board. We also posit that debt yields are negatively related to board size as larger boards may increase the level of managerial monitoring (i.e., a greater number of guards) and enhance the financial accounting process.

For most large firms, boards of directors delegate direct oversight of the financial accounting process to a subcommittee of the full board, the audit committee. Recent regulations put forth by the major stock exchanges requiring that a minimum of three independent directors serve on the audit committee suggest that committee independence and size may be integral factors for firms in delivering meaningful financial reports. If audit committee composition influences the financial accounting process, we then anticipate that corporate debt yields will exhibit an inverse relation to committee independence and size.

Using a sample of 252 industrial firms from the S&P 500, we find that board independence is associated with a substantially lower cost of debt financing. Our analysis indicates that debt costs are 17.5 basis points lower for firms with boards dominated by independent directors relative to firms with insider-stacked boards. We also find a negative relation between board size and the cost of debt financing. Specifically, we find that an additional board member is associated with about a 10-basis-point-lower cost of debt financing. Overall, our empirical results indicate that bondholders view board independence as an important element in the pricing of the firm's debt, suggesting that creditors are sensitive to board attributes that affect reporting validity.

The analysis also indicates that creditors view audit committees and their characteristics as important elements in the financial accounting process. Specifically, we find that the cost of debt is about 15 basis points lower for firms with fully-independent audit committees relative to those with insiders or affiliates on the committee. Focusing on the size of audit committees, we find that committee size ranges from one to 12 directors, with most committees having either four or five members. The analysis indicates that for the average-size audit committee, an additional board member is associated with a 10.6-basis-point-lower cost of debt. Overall, these results suggest that creditors view audit committees as an important device in ensuring the reliability of accounting reports.

We also conduct supplemental analysis on independent director attributes because director expertise or occupational characteristics may influence the board's ability to effectively monitor management and the firm. Recent passage of the Sarbanes-Oxley Act by the US Congress also requires that at least one "financial expert" serve on the firm's audit committee. In light of this new regulation, we also investigate whether financial experts influence the cost of debt financing. We find no relation between debt costs and director employment characteristics and financial expertise. In sum, these tests suggest that the primary concern of creditors is the presence of independent directors on the board and audit committee, as opposed to director expertise.

Our analysis supports the notion that board independence and board size influence the cost of debt financing. We interpret this to suggest that bondholders are concerned with governance mechanisms that limit managerial opportunism and improve the financial accounting process. Additionally, our analysis suggests larger, more independent audit committees provide a measurable and significant benefit to the firm, namely through a lower cost of debt financing. These results support recent regulatory and listing requirements (see NYSE, NASDAQ, recent SEC proposals, and the Sarbanes-Oxley Act) concerning audit committee independence; as well as calls for more actively involved audit committees.

In conclusion, we find compelling evidence that board and audit committee monitoring substantially impact the cost of debt financing. The results indicate that firms with large independent boards and audit committees are associated with a lower cost of debt financing, suggesting that boards of directors are an important element of the financial accounting process. ■

Taken from:

Anderson, Ronald C., Mansi, Sattar A., and Reeb, David M.* "Board Characteristics, Accounting Report Integrity, and the Cost of Debt." *Journal of Accounting and Economics.* September, 2004.

Banker *continued*

In predicting earnings for the years 2000-03, the coefficients on the Y2K spending terms are significantly positive for firms in the informate and transform industries and significantly negative for firms in the automate industries. The large, significantly positive coefficient for the transform firms provides evidence in support of Hypothesis 5 that future earnings were positively impacted by Y2K spending for firms in these industries. This result directly links higher future earnings to Y2K spending and supports the implicit assumption that higher stock price values associated with higher Y2K spending are informative about future performance. The joint observation of higher stock price values and higher future earnings associated with Y2K spending by firms in transform industries provide complementary evidence that higher Y2K spending did help firms create value.

Following Hitt, Wu and Zhou (2002), who evaluated the impact of Enterprise Resource Planning systems on company performance for companies that implemented SAP during this time period, we also considered a number of other financial performance measures. Firms in transform industries that spent more on Y2K realized greater improvements in profit margin on sales (Net Income / Sales) and asset turnover (Sales / Total Assets) than other firms. The increase in profitability is primarily seen in the increased gross profit margins on sales, possibly by connecting more closely with customers and suppliers. The increase in asset turnover is primarily seen in the higher inventory turnover (COGS / Average Inventory). This indicates that firms in the transform industries that spent more on Y2K were better able to coordinate their inventory needs with suppliers.

Conclusion

Managers face difficult decisions about IT investments because implementation of new IT is costly, disrupts business activities, puts strain on employees and has uncertain payoffs. In addition, there are strong incentives to put off investing in IT because a better solution may come out and it is easier to wait while others bear the costs and risks of innovating (Carr, 2003). It is also difficult to quantify the expected benefits of new IT implementations that alter the way companies do business. Y2K was an intersection of opportunities to invest in innovative IT and the requirement to deal with potentially disruptive problems in existing IT.

Some critics believe that managers got carried away by the Y2K bug and made unnecessary and unwise investments (Kong and Seipel, 2000). John Gantz, chief research officer at International Data Corporation, remarked, "There has been a lot of spin doctoring to try and find benefits but the fact is that we fixed more than we needed to" (Bowen, 2000). On the other hand, Lawrence Kudlow, chief economist at Schroder & Co. Inc. in New York, argued that "the Y2K-spurred information upgrade by businesses will yield productivity, profit and rate-of-return increases that may not be officially recognized and reported for years. In particular, business-to-business and business-to-supplier information improvements are going to be a huge plus for cost control, price-cutting and inventory management" (Kudlow, 2000). We find the evidence that Kudlow anticipated.

"We find significantly positive associations between earnings in 2000 through 2003 and Y2K spending in 1999 for firms in the transform industries."

Porter (1999) observed that the essential core of strategy is cross-functional or cross-activity integration, the capacity to link and integrate activities across the whole value chain. When we evaluated the value implications of Y2K spending across industry types, we found strong positive impacts in those industries where IT was playing a transforming role. This result counters claims based on isolated anecdotal evidence that Enterprise Resource Planning and other integrated systems are not paying for themselves and suggests the need for more research on the performance effects of enterprise systems.

Our finding of overall positive value implications of investments in IT by firms in the transform industries, in the face of observed failures in some situations, illustrates the importance of recognizing differences in firms' abilities to utilize new IT (Bharadwaj, 2000). The lack of support for the relative investment hypothesis indicates value creation and appropriation from the competitive dynamics of IT investments are complex. While the ease of replication of IT makes it tempting to think that abnormal returns to investment in IT are likely to be wiped out by competitors making similar investments, this is not necessarily the case. Our analysis shows that companies that spent more during the Y2K period improved their earnings performance and increased shareholder value. ■

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Online Gradebooks: A Burden for Faculty and Boon for Students? Are They Really Worthwhile?

by Deanna Geddes, Associate Professor, Department of Human Resource Management

"Student use of online gradebook monitoring not only significantly predicted their final class grade, but also appears related to classroom satisfaction."

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Increasingly available and utilized web-based course management systems (CMS) include an online gradebook feature that can allow students unprecedented and continuous access to their assignment grades and respective class averages throughout the semester. This unique addition to the traditional performance information environment may have significant implications for student engagement, learning, and achievement.

Dr. Deanna Geddes, Associate Professor of Human Resource Management at the Fox School has empirically explored questions surrounding student use of online gradebooks; specifically, student feedback-seeking behaviors in the context of classes incorporating this information technology, and its impact on overall student performance.

To date, no known research has examined the impact of online gradebooks on actual student performance. Thus, she questioned whether traditional performance evaluation practice, i.e., "posting grades," and information technology could interact in a way that supports, accelerates, or even optimizes student achievement. Could use of online gradebooks improve student performance?

Dr. Geddes suggests the way to understand this issue is to consider it a unique form of feedback-seeking — a concept that has helped shape the nature of performance feedback research — one of the most widely researched areas in industrial and organizational psychology (Murphy & Cleveland, 1995). Feedback seeking is defined as the degree individuals actively pursue and acquire relevant information about their performance (Ashford, 1986; Ashford & Cummings, 1983). The two forms of this behavior are inquiry/eliciting and monitoring. Whereas feedback eliciting includes directly querying teachers and even peers about one's own work feedback monitoring involves observing the environment — the written documents, reports, grades and the behavior of others — peers and teacher to gain information about one's performance.

Online gradebook monitoring is a novel form of feedback monitoring. Results from Dr. Geddes' preliminary studies show that this primary feedback-seeking behavior significantly impacts student classroom achievement. She reports online gradebook monitoring was a positive predictor of students' final course grade. Implications for future research and educational (as well as corporate) practices are multidimensional. The impact of an individual's ability to access to ongoing and archival performance appraisal information may capture as well as promote the degree of academic engagement through self management, enhance student self awareness and self assessment through comparison of grade information with their peers, and boost perceptions of procedural justice with performance evaluation practices.

It is important to develop educational tools and relevant guidelines based on sound and rigorous research. Dr. Geddes' preliminary study provides useful and timely information in the context of an explosion of CMS use across universities, especially among business faculty. However, its long- term consequences may be substantial across all educational settings, with regard to technology adoption and use, and student self-management and learning patterns. From related research (Levy, Albright, Cawley, & Williams, 1995), it is known that individuals particularly concerned with impression management in achievement environments such as school or work may initially desire to seek feedback, but not if there's an audience. Further, studies show that eliciting/inquiry is the least likely form of feedback seeking — especially among students. Thus, it seems appropriate that organizations including educational institutions identify technologies and practices that can help individuals acquire useful performance information, while simultaneously eliminating the fear and risk individuals associate with feedback seeking in a public context. The online gradebook appears to provide this type of educational support. ■

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The Fox School of Business and School of Tourism and Hospitality Management

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* Bold font represents Fox and STHM faculty

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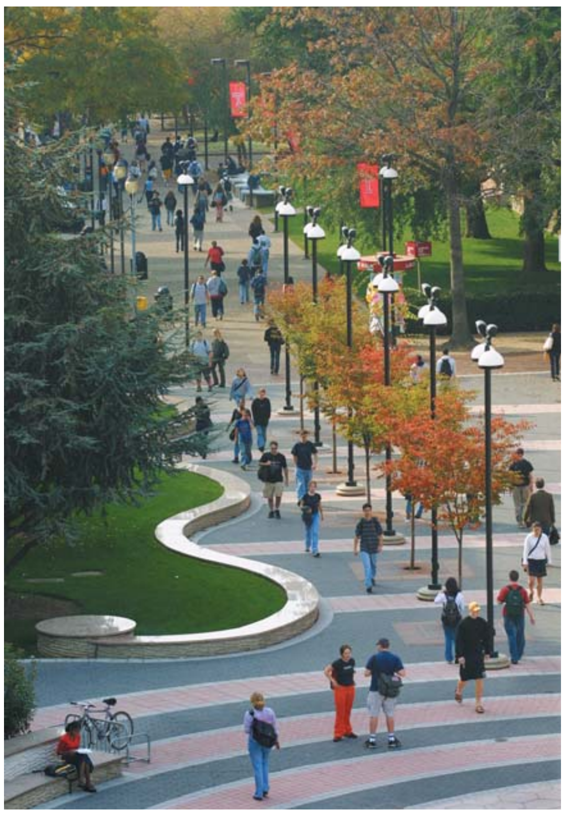

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J JOURNALS

The Fox School of Business faculty serve as editors of the following journals.

More information about the journals at: http://www.sbm.temple.edu/crc/journals.html

Journal of Economics and Business

Editor: Kenneth J. Kopecky, W.D. Fuller Professor of Economics and Finance, Chair, Department of Finance, Temple University, Fox School of Business, Philadelphia, Pa.

Journal of International Management

Editor: M. Kotabe, The Washburn Chair of International Business and Marketing, Temple University, Fox School of Business, Philadelphia, Pa.

Managing Editor: K. Cahill, Director, IGMS/CIBER, Temple University, Fox School of Business, Philadelphia, Pa.

Journal of Product Innovation Management

Editor: Anthony Di Benedetto, Ph.D., Professor, Department of Marketing, Temple University, Fox School of Business, Philadelphia, Pa.

Journal of Risk Finance

Editor: Michael R. Powers, Ph.D., Professor, Department of Risk Insurance and Healthcare Management, Temple University, Fox School of Business, Philadelphia, Pa.

Risk Management and Insurance Review

Editors: Michael R. Powers, Ph.D., Professor, Department of Risk Insurance and Healthcare Management, Temple University, Fox School of Business, Philadelphia, Pa. and Mary A. Weiss, Ph.D., Professor, Department of Risk Insurance and Healthcare Management, Temple University, Fox School of Business, Philadelphia, Pa.

Benefits Quarterly

Editor: Jack L. VanDerhei, Ph.D., CEBS, Associate Professor, Department of Risk Insurance and Healthcare Management, Temple University, Fox School of Business, Philadelphia, Pa.

The Financier

Editors: Anne Zissu, Ph.D., Professor, Department of Finance, Temple University, Fox School of Business, Philadelphia, Pa. and Charles A. Stone, University Paris Dauphine, France.

The Securitization Conduit

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Featured Center

Innovation and Entrepreneurship Institute (IEI)

The Innovation and Entrepreneurship Institute (IEI), Temple University's gateway to the entrepreneurial world, cultivates the entrepreneurial spirit through Temple and the greater Philadelphia region by bringing together students, entrepreneurs, mentors, alumni, faculty and business advisors to grow/build new ventures.

IEI's educational resources include major conferences — with annual themes including women's entrepreneurship, science and technology, entrepreneurship in the arts, and social entrepreneurship — as well as special workshops and seminars throughout the academic year.

The IEI offers the following entrepreneurial resources and educational programs:

Temple University Council on Entrepreneurship: A multi-disciplinary committee dedicated to making applied entrepreneurship available to students, faculty and staff in all 17 Temple colleges and schools.

IEI Business Plan Competition: This annual competition, which emphasizes science and technology, enables students, faculty, staff and alumni from all Temple schools and colleges to create new business ideas and plans. The prize package includes cash and services and is worth $25,000.

Mid-Atlantic Diamond Ventures: The region's only year-round venture forum, offering coaching and technical assistance to science and technology start-up companies from New York to Virginia.

The Enterprise Management Consulting practicum (EMC) and the Global Entrepreneurship in Technology (GET): Two innovative, award-winning, and hands-on learning experiences involving faculty, MBA students, mentors from the industry, and the alumni of Temple University's Fox School of Business and Management. EMC features capstone consulting practicum courses in which student teams help firms explore new business opportunities and integrate course work, business experience, and primary and secondary research into highly professional market entry strategies or business plans. GET involves students and faculty from international partner universities, and firms in Israel, Ireland, France, and India.

Temple University League for Entrepreneurial Women: This advocacy initiative, a collaboration between the Fox School of Business, the School of Tourism and Hospitality Management and the School of Communications and Theater, addresses the interests of entrepreneurial women in the Philadelphia region.

IEI Mentor Network: IEI's extensive network of successful entrepreneurs, senior executives, venture financiers and service providers serve as business plan judges, team mentors, coaches, industry experts and speakers. This network also helps connect the best students start-ups with funding. Prominent entrepreneurs and senior executives are invited to serve as Entrepreneurs or Executives-in-Residence.

Temple University International Venture Fair: This annual event brings together international entrepreneurs, investors, student consulting teams and senior executives in an investment marketplace designed to provide opportunities for bringing global high-technology to the US market.

Graduate Student Entrepreneurship Club & Entrepreneurial Student Association/Students in Free Enterprise: These clubs offer opportunities for graduate and undergraduate students interested in entrepreneurship to get together, explore common interests and form teams to fulfill their entrepreneurial goals.

IEI Business Plan Workshops: During the academic year, the IEI offers a wide variety of business plan workshops for students, faculty, staff and alumni on topics ranging from innovation management to competitive analysis.

IEI Innovation Laboratory: This space is constantly abuzz with workshops, team meetings, group presentations, business plan judging, round-table discussions, student club meetings and mentor networking.

In a 2006 survey conducted by *The Princeton Review* and published by *Entrepreneur* magazine, Temple University's Fox School of Business was ranked among the top entrepreneurship programs in the nation. The Fox School's undergraduate program was ranked number 4 and its graduate program was ranked number 7 out of the best 100 most comprehensive collegiate entrepreneurship programs. For the last four years that this survey has been published by *Entrepreneur* magazine, The Fox School has consistently been ranked among the top most comprehensive entrepreneurship programs in the U.S. and its ranking increased dramatically, especially during the last two years.

Innovation and Entrepreneurship Institute

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Featuring Doctoral Student: Iana Jucá

Bachelor in Business Administration
Federal University of Ceará (UFC), Brazil 1995.

Masters of Science, Actuarial Science
Temple University 1999.

Ph.D. Candidate, Department of Risk, Insurance and Healthcare Management
Temple University.

Q: In which areas of research are you most interested?

A: My primary research interests are currently in the area of risk theory and insurance and reinsurance regulation, including the analysis of insurer's profitability and solvency.

Q: How does your research contribute to your academic discipline?

A: In my research, I have focused on issues such as solvency monitoring and market structure within actuarial science. The focus has been on building an empirical model that deals explicitly with the optimal number of insurers and reinsurers in a market and the effect that risk aversion has on this relation. I believe that a significant contribution of my research to actuarial science has been to present a theoretical understanding of the impact that error in the estimation of the parameters may have on the determination of the probability of ruin of an insurer.

Q: Why Temple University? How did you make the decision to pursue a doctorate from the Fox School of Business?

A: The Ph.D. program in business administration with a primary concentration in risk and insurance offered by the Fox School of Business just seemed to suit me perfectly. With a bachelor's degree in business administration and a M.S. in actuarial science (from Temple University), I realized that, in this program, I could combine both my backgrounds and have the opportunity to further my knowledge and research skills.

Q: How does the Fox School of Business support your doctoral program?

A: During these years at the Fox School, I have had the opportunity to interact with several professors who were outstandingly challenging and have provided a very stimulating research environment. In my first year, I was lucky to have the opportunity to work with Professor Michael Powers who helped me establish my first research initiative. He was very approachable and open to discussions. I have also found a lot of support for attending professional meetings, allowing me to expand my network of professional colleagues. Furthermore, the collegiality among my fellow doctoral students offered even more opportunities to exchange knowledge, experience and ideas.

Q: What are your academic plans for the future?

A: While working toward completing my Ph.D. I also have a position as assistant professor of actuarial science in the Federal University of Ceará, Brazil. After graduation, my goal is to continue to teach. I love the classroom environment and the interaction with students. Research is also in my agenda. I plan to concentrate more on the insurance regulatory issues in Brazil.

FEATURED GRANTS

Arvind Phatak, Professor, General Strategic Management, and Executive Director of the Institute of Global Management Studies, and the Temple University CIBER. Temple Center for International Business Education and Research (CIBER) has been renewed for four more years with a $1.33 million award from the U. S. Department of Education. The CIBER grant from the Department of Education is awarded every four years to only 31 business schools throughout the United States that have demonstrated excellence in academic research and outreach programs in international business.

Mark Gershon, Professor and Department Chairman, Management Science/Operations Management and **Pallavi Chitturi,** Lecturer, Department of Statistics. Drs. Gershon and Chitturi have received funding from CACI International Inc. which has received a grant from the United States Navy intended to establish a Naval Logistics Readiness Research Center (NLRRC) in Philadelphia. As part of the CACI grant, Drs. Gershon and Chitturi will focus on a statistical process control technique. Their research will assess the effectiveness of current procedures for evaluating usage rates of spare parts. The current grant covers one year at $55,000, and a renewal application has been submitted for a second and third year.

Sanat Sarkar, Professor, Statistics, has been awarded $170,000 from the National Science Foundation, Mathematical Sciences (DMS) – Statistics for his study titled "Multiple Testing: Further Development Of Theory And Methodology." The project will further develop statistical theory and methodology for problems in multiple hypothesis testing. The results are important to any statistical investigation where questions are posed in terms of testing several hypotheses; for instance, in microarray studies where the detection of genes that are differentially expressed is often framed as a multiple testing problem, in pharmaceutical investigations where multiple testing techniques are routinely used in dose-response study, or in evaluating a drug's efficacy over standard drug or placebo.

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